

Name: _____

Experiment #2 — The Measurement Challenge

Materials (for each lab group):

Balance

Metric ruler, 0.1 cm markings

Calculator

Plastic block

Procedure:

Note: Success of this laboratory activity depends on the ability to take accurate measurements, to make valid estimations, and to apply rules for significant figures in mass and volume (and density) calculations.

1. Obtain a plastic block from the teacher. Record the block number and color of the sample. The block number must be different from any of the block numbers used in Experiment #1.

Block Number: _____ **Color of Block:** _____

2. Measure the dimensions (length, width, and height) of the block. Be sure to estimate all measurements to the correct decimal place and to include units with each measurement.

Length: _____ **Width:** _____ **Height:** _____

3. Calculate the volume of the block using Equation 1. Round the answer to the proper number of significant figures. Record the volume in the data table. Be sure to include the appropriate units.

Volume: _____

4. Use the known density value and the volume calculated in question 3 to predict the mass of the plastic sample. The known density values for each different type of colored plastic are shown in the table below. The density equation can be rearranged to solve for mass as shown in Equation 3.

Color of Block	Density (g/cm ³)
White	0.541
Black	0.985
Milky-white	0.908
Clear	1.18
Gray	1.42

Predicted Mass of Block: _____

5. When the mass of the plastic block has been calculated and a prediction made, bring the block to the teacher. The teacher will measure the actual mass of the block using a laboratory balance.

Actual Mass Measurement: _____

Teacher Initials: _____

(To be filled in by the teacher)

6. Determine the accuracy of the mass calculation by comparing the predicted (calculated) mass with the actual (measured) mass. Calculate the percent error (or difference) in the mass calculation using the equation below. (Or the teacher will perform the error calculation at the balance right in front of the student. Instant feedback!)

$$\text{Percent Error} = \frac{|\text{Calculated Mass} - \text{Actual Mass}|}{\text{Actual Mass}} \times 100 =$$

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